

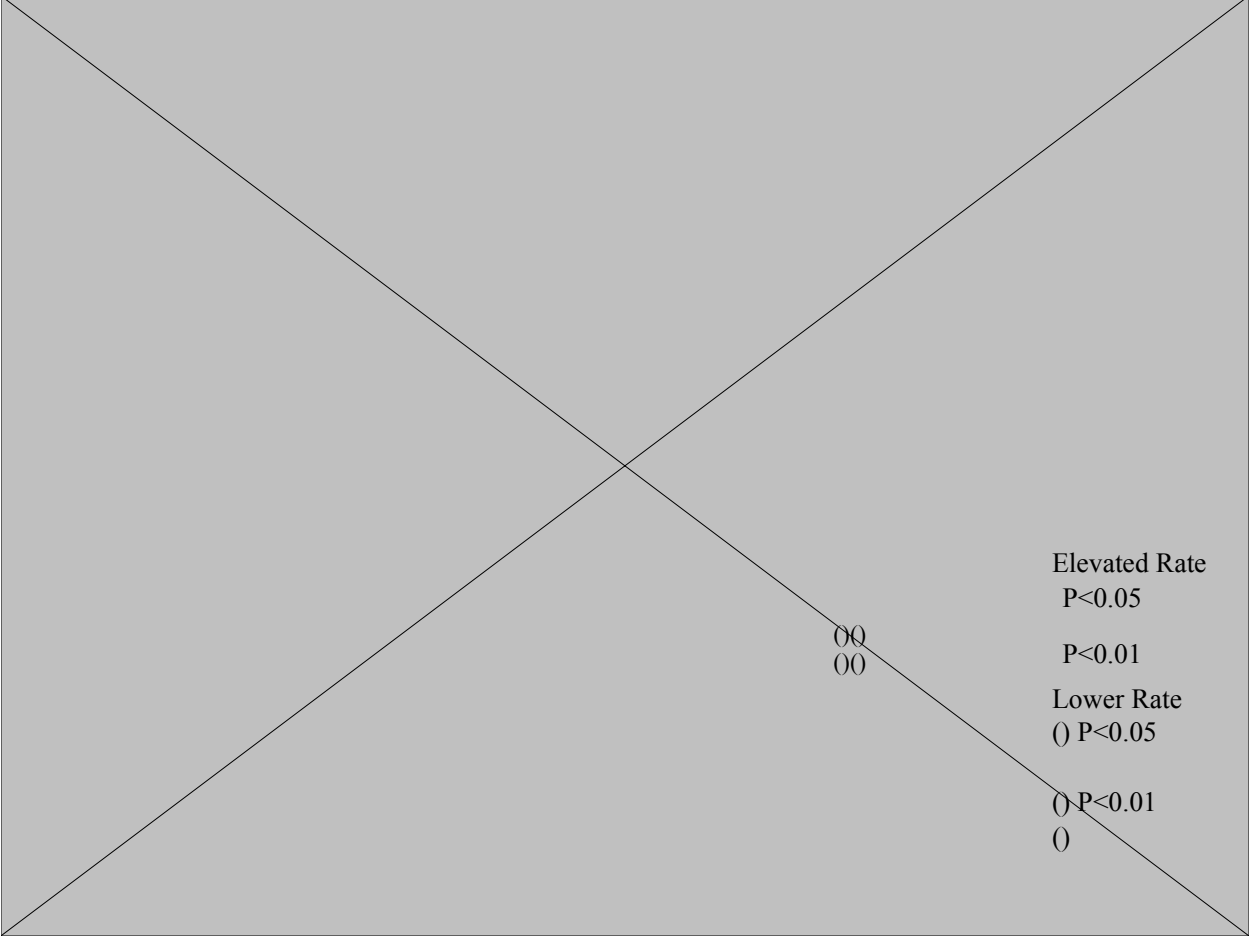
International Joint Commission  
SAB Workshop on  
An Ecosystem Approach to the  
Health Effects of Mercury  
in the Great Lakes Basin,  
February 26/27, 2003, Windsor, Ontario

Michael Gilbertson

*Presentation to the*  
Binational Toxics Strategy Meeting  
Wednesday, 14 May, 2003,  
Windsor, Ontario.

## Introduction

- 1998, Health Canada published data and statistics on community health in 17 Canadian Areas of Concern;
- Selected 70+ health endpoints the “might be related to exposures to pollutants”;
- Cerebral palsy included because of association with exposures to methylmercury;
  - Minamata, Japan, 1950s;
  - Iraq, 1960s and 1970s



## 2001-2003 IJC Priorities

- Mercury chosen as a priority;
- Great Lakes Science Advisory Board activities
  - Consultation on the Health Effects of Mercury, Ann Arbor, February 2002;
  - Workshop on An Ecosystem Approach, Windsor, February, 2003 (IAQAB/HPTF).

# An Ecosystem Approach

- In 1978, Science Advisory Board recommendation to the International Joint Commission;
- Tool to respond to scientific complexity of persistent toxic substances:-
  - Multimedia sources and sinks;
  - Multimedia fate and distribution;
  - Multimedia routes of exposure;
  - Exposures of critical subpopulations;
  - Identify health effects and
  - Focus public health interventions and remedial actions.

# **Great Lakes Science Advisory Board** **Consensus Workshop Summary**

## **Sources, sinks, pools, exposures and effects**

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Laurie Chan, Ph.D., McGill University  
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## **Anthropogenic Sources, Sinks and Pools**

- Local, regional and global;
- Cycling between biosphere, earth, air and water;
- In sediment, converted to methylmercury;
- Biomagnification in food chains;
- 20% of Great Lakes loadings are from global sources and deposition;
- Need for international cooperation.

## **Anthropogenic Sources, Sinks and Pools**

- Legacy in Great Lakes from past practices and former industrial sites;
- Mercury cell chloralkali plants;
- Slimicide in paper manufacturing;
- Mining gold;
- Pesticide application;

## **Anthropogenic Sources, Sinks and Pools**

- Need further inventories for mass balance approaches to loadings, sources and fate;
- Need to reduce mercury in products and in waste streams.

# Mercury Exposure and Human Health Effects

- Mercury extensively reviewed (ATSDR 1999);
- Methylmercury extensively reviewed (NAS/NRC 2000);
  - Exposure from consumption of fish;
  - Potent neurological toxicant;
  - Mercury causes subtle, adverse neurological effects at low doses;
  - With more information, exposure level associated with adverse effects has been lowered.
- Some Great Lakes fish consumers are above the levels of potential health concerns (5.8 ppb in blood EPA).

# NAS/NRC Conclusion

- **Mercury Exposure and Human Health Effects**

- National Academy of Sciences (2000)  
Toxicological Effects of Methyl Mercury
- Children of women who consumed large amounts of fish and seafood during pregnancy are at highest risk.
- *“...Predicted increase in the number of children who have to struggle to keep up in school and who require remedial classes or special education”.*

# National Trends in U.S. Fish Advisories for Various Pollutants

NLFWA December 1999

## Consensus Summary – Consumption Advisories

- In 1990's, several Great Lakes States and the Province of Ontario issued sport fish consumption advice for women and children for all lakes;
  - For “unrestricted” category – only one meal per week;

## Consensus Summary – Consumption Advisories

- In 2001, EPA issued national sportfish advice (meal per week) and
- FDA issued national advice for consumption of fish caught commercially;
- In 2003, U.S. blood survey (NHANES) 8% of women above safe levels;
  - 320,000 infants/yr at risk (EPA, 2000).

## Consensus Conclusions - Mercury Levels and Sources

- Recent declines in mercury in Great Lakes fish;
- Some AOCs and inland lake fish are still up to 10 fold higher than acceptable levels;
- Further research is needed on sources and inputs to more effectively target mercury reduction strategies.

## Health Implications and Future Research

- High intake women consumers of fish from certain AOCs or inland lakes would be expected to have mercury exposures resulting in adverse health effects in the developing child;
- Epidemiological evaluations should be undertaken in the Great Lakes area to determine if health effects exist as seen in other locations in the world.

# Risk Management and Risk Communication

- Low awareness of fish advisories among women and ethnic minorities;
- More effective risk communication approaches are needed to reduce mercury exposures;

# Risk Management and Risk Communication

- Need to balance risk communication with health benefits of fish consumption;
- Sensitivity is needed to avoid nutritional and cultural impacts (e.g., First Nations).